Appl. No.	:	09/420,002
Applicant	:	Marc A. Cohen et al
Filed	:	Oct 18, 1999
Title	:	SPONSORED INFORMATION DISTRIBUTION METHOD AND APPARATUS
TC/A.U.	:	2645
Examiner	:	Allan Hoosain
Docket No.	:	2490-001DIV
Conf. No.	:	2196

Mail Stop RCE
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Petition under 37 CFR 1.114 - Request for Continued Examination

Sir:

Applicant respectfully enters this request for continued examination (RCE) in order that the hereto attached correction of inventorship and the declaration of inventor Marc A. Cohen can be considered. The attached correction of inventorship and declaration were previously submitted (via facsimile) but have not reached the examiner for consideration.

Remarks/Arguments begin on page 2 of this paper

REMARKS / ARGUMENTS

The examiner entered a 35 U.S.C. 102(e) rejection of claims 13-28 on September 25, 2003, citing as reference U.S. Patent 5,933,811 (filed Aug. 20, 1996).

This rejection is respectfully traversed by the earlier priority date claimed by the inventors. In particular, this invention claims priority to U.S. Provisional Patent Application Serial No. 60/023,256, filed August 9, 1996, along with other provisional patent applications. The priority date of this invention (August 9, 1996) is antecedent to U.S. Patent 5,933,811. Therefore, U.S. Patent 5,933,811 may not be relied upon for rejection under 35 U.S.C. 102(e). In view of the above, applicants respectfully request that the correction of inventorship be entered and a Notice of Allowability be issued in this case.

Should any further questions arise concerning this application or in the event the application is no longer in condition for allowance, applicant respectfully requests an office interview. Attorney for the applicant may be reached at the number listed below.

Respectfully Submitted,
Roberts Abokhair & Mardula, LLC

By _____

Timothy W. Graves, Reg. No. 45,940
Tel.: (703) 391-2900
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Appl. No.	:	09/420,002
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Cust. No.	:	22208

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PETITION FOR CORRECTION OF INVENTORSHIP UNDER 37 CFR §1.48

* * * * * * * * * * * * * * * * * *

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

At the time of filing the above-identified divisional application, Michael C. Cudemo III was omitted as one of the inventors.

Attached is the declaration of Marc A. Cohen, John J. Csaszar and Michael C. Cudemo III as required by 37 CFR §1.48 explaining how this occurred.

It is respectfully requested that Michael C. Cudemo III be added as an inventor.

Enclosed is check in the amount of $130.00 to cover the fee as set forth in 37 CFR §1.17(h).

Respectfully Submitted,

Roberts Abokhair & Mardula, LLC

By _____

Timothy W. Graves, Esq., Reg. No. 45,940
Tel.: (703) 391-2900
Fax: (703) 391-2901

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DECLARATION OF
MARC A. COHEN, JOHN J. CSASZAR, AND MICHAEL C. CUDEMO III

* * * * * * * * * * * * * * * * * *

We are the inventors of the above-identified United States Patent Application. This patent application is a divisional application of United States Patent Application number 08/869,753 (now United States Patent 5,970,124). Parent patent application 08/869,753 lists Marc A. Cohen, John J. Csaszar, and Michael C. Cudemo III as co-inventors. However, this divisional patent application omitted the name of co-inventor Michael C. Cudemo III.

During creation of the invention, all three co-inventors were employees of VoiceFX Corporation and have assigned their rights in the invention described in Application number 08/869,753 to VoiceFX Corporation, including "any continuing or divisional application thereto" (Paragraph 1 of Assignment, Reel/Frame: 9215/0488).

Without deceptive intent, co-inventor Michael C. Cudemo III was omitted as a co-inventor at the time the divisional application was filed. Michael C. Cudemo III was employed as a system analyst and programmer. It was believed by co-inventors Marc

Cohen and John Csaszar that the work Michael C. Cudemo III performed on the invention was limited to work performed under the direction and control of co-inventor John Csaszar, and that the conception of the invention was primarily that of co-inventors Marc Cohen and John Csaszar.

Subsequent to a more detailed review of the work-product produced by Michael C. Cudemo III relative to the invention, it is believed that his work amounts to a material contribution to the invention, especially in the reduction to practice of the invention. As a result, it is now desired to amend the inventorship and include Michael C. Cudemo III as a co-inventor.

I, Marc A. Cohen, hereby agree to the addition of Michael C. Cudemo III as a co-inventor.

I, John Csaszar, hereby agree to the addition of Michael C. Cudemo III as a co-inventor.

I, Michael C. Cudemo III, hereby agree to be added as a co-inventor.

I, Marc A. Cohen, and I, John J. Csaszar, and I, Michael C. Cudemo III further declare that we do not believe the claimed invention was ever known or used in the United States before our invention thereof, or patented or described in any printed publication in any country before our invention thereof or more than one year prior to the effective priority date of the application, that the same was not in public use or on sale in the Untied States of America more than one year prior to the effective priority date of the application, and that the invention has not been patented or made the subject of an inventor's certificate issued or filed by us or our legal representatives.

Appl. No 09/420,002
Response to Advisory Action of Dec 11 2003

We all declare further that all statements made herein are made upon our own information and belief and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date 12/23/03 By _____
Marc A. Cohen

Date 12/23/2003 By _____
John J. Csaszar

Date 1/13/2004 By _____
Michael C. Cudemo III

Appl. No.	:	09/420,002
Applicant	:	Marc A. Cohen et al
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DECLARATION OF Marc A. Cohen
UNDER 37 C.F.R. § 1.131

* * * * * * * * * * * * * * * * * *

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

I, Marc A. Cohen, declare as follows:

I am a co-inventor of, and applicant for patent on, the invention entitled "SPONSORED INFORMATION DISTRIBUTION METHOD AND APPARATUS", disclosed and claimed in U.S. patent application no. 09/420,002, filed October 18, 1999.

U.S. patent application no. 09/420,002 claims priority to U.S. provisional patent applications 60/019,177, 60/023,258, 60/023,256, 60/024,006 and 60/026,307. Of particular interest to Internet dissemination of custom advertising is U.S. provisional patent application 60/023,256, filed August 9, 1996 with a title of "METHOD AND APPARATUS FOR DIRECTED ADVERTISING IN AN INTERNET-BASED INFORMATION DISSEMINATION SYSTEM".

Appl. No. 09/420,002
Declaration Under 37 C.F.R. §1.131
Response to Advisory Action of Dec. 11, 2003

Prior to February 26, 1996 a preferred embodiment of the invention was completed and outlined in the Software Appendix that was filed as an appendix to application 60/023,256. The Software Appendix incorporates features also described in "The Ads Database Server Design" attached to application number 60/023,258. A complete copy of application 60/023,256 and "The Ads Database Server Design" is attached hereto.

In view of the above recitation of facts and the attached copy of the supporting provisional application, I respectfully submit that I, in conjunction with co-inventors, had achieved a successful reduction to practice of the invention, as described and claimed in the subject application, in this country prior to February 26, 1996.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 12/22/03

By: _____
Marc A. Cohen

[redacted]

PILOT TEAM

Class	Subclass	ISSUE CLASSIFICATION

PROVISIONAL APPLICATION NUMBER
60/023256

SERIAL NUMBER	FILING DATE	CLASS	SUBCLASS	GROUP ART UNIT	EXAMINER
60/023,256 PROVISIONAL	08/09/96				

APPLICANTS

MARC A. COHEN, PHILADELPHIA, PA; JOHN J. CSASZAR, FLEETWOOD, PA; MICHEAL CUDEMO III, DOWNINGTOWN, PA.

CONTINUING DATA********
VERIFIED

FOREIGN/PCT APPLICATIONS********
VERIFIED

FOREIGN FILING LICENSE GRANTED 08/30/96

Foreign priority claimed 35 USC 119 conditions met	Verified and Acknowledged	Examiner's Initials	AS FILED	STATE OR COUNTRY	SHEETS DRWGS.	TOTAL CLAIMS	INDEP. CLAIMS	FILING FEE RECEIVED	ATTORNEY'S DOCKET NO.
☐ yes ☐ no ☐ yes ☐ no				PA	5			$150.00	DLA

ADDRESS

D LEE ANTTON
WATSON COLE STEVENS DAVIS
1400 K STREET N W
WASHINGTON DC 20005

TITLE

METHOD AND APPARATUS FOR DIRECTED ADVERTISING IN AN INTERNET-BASED INFORMATION DISSEMINATION SYSTEM

U.S. DEPT. OF COMM./ PAT. & TM — PTO-436L (Rev.12-94)

Form PTO-1625
(Rev. 5/95

LB

(FACE)

60/023256

Provisional United States Patent Application

METHOD AND APPARATUS FOR DIRECTED ADVERTISING IN AN INTERNET-BASED INFORMATION DISSEMINATION SYSTEM

by

Marc A. Cohen

John J. Csaszar

and

Michael Cudemo III

Prepared by
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WATSON COLE STEVENS DAVIS P.L.L.C.
1400 K Street, Suite 1000
Washington D.C. 20005
(202) 628-0088

BACKGROUND AND SUMMARY OF THE INVENTION

The Internet and the World Wide Web (collectively "the Internet") are an interactive medium for information exchange. The Internet presently has over 30 million users and the number of users continues to grow rapidly. The Internet provides an interactive medium for the publication and dissemination of information on a global basis that is becoming a ubiquitous and fairly inexpensive telecommunications medium.

The interactive nature of the Internet makes it very attractive to advertisers and marketers. The Internet has the ability to give an individual access to a particular good or service, to make a sale and to deliver digital products and services such as software or information, and to do so inexpensively and in essentially real-time transaction sessions. The Internet allows customers to interact with advertisements as well as accept an offer on line and in real time. The interactivity of the Internet thus has the potential to save time and reduce costs for advertisers and marketers and consumers.

However, attempts at advertising and marketing on the Internet have thus far faced significant challenges. The Internet is predominately a publishing medium that does not provide sufficient facilities for commerce. For example, users of the Internet have a separate Internet identity that they can define and redefine each time they log on. The identity of Internet users is no more than a screen moniker or an e-mail address. Internet access companies often allow users to create multiple persona which effectively obscure

their actual identity. This ambiguity results in Internet users being effectively anonymous. This anonymity, in turn, precludes vendors of goods and services from directing information, products and services to individuals who are most likely to desire them. Penetrating this anonymity is difficult under the best of circumstances and also raises issues concerning the privacy rights of users of the Internet.

Due to these difficulties, among others, marketing on the Internet is not yet efficient. Advertisers and marketers often receive a poor return for their advertising and marketing dollars, and consumers are increasingly frustrated by irrelevant advertising messages, "junk e-mail" and the like.

The problems associated with advertising and marketing on the Internet must be overcome before consumers and advertisers and marketers can realize the Internet's potential to improve efficiency, save time and effectively facilitate the transaction of business.

One of the great advantages of the Internet, World Wide Web and the like is the ability to deliver information that consumers desire. For example, the Internet can be used to report the course grades of students. Each student desiring to know his or her grades for a semester can log on to a Web site containing this information. Utilizing passwords and other forms of identification, the information can be delivered to the particular student in question only. Students appreciate the ability to learn their grades from a remote location in

advance of a formal grade report. Students and other consumers often do not object to, advertisers and marketers paying for student's access to their grade reports, and may enjoy the often creative advertisements and offers for products and services.

The ability to target particular advertisements and offers to those consumers who are apt to be interested in the messages has great value to advertisers and marketers. Advertisers and marketers are often willing to pay a premium to reach these consumers with advertisements and offers that are directed to their anticipated needs and interests. Direct advertisers and marketers have learned that consumers that share particular attributes often have comparable needs and interests. Even more important, the Internet has the potential to allow advertisers and marketers to adapt their messages to consumers in essentially real time. The revenue that these advertisers and marketers can be expected to be willing to pay could be used to offset the cost of disseminating information. However, thus far, the ability of directed advertising and directed marketing to pay for information dissemination has been effectively blocked by the essentially anonymous nature of access to the Internet.

There is a need in the art to establish a way to direct advertising (the display of a banner) and offers (the taking of orders) (herein collectively referred to as "advertising messages") over the Internet to particular target markets e.g., those individuals who are or are most likely to be most receptive to the information. There is also a need for a way to defer the expenses associated with disseminating information over the Internet. Among the

objectives of the present invention are to solve these two problems. It is a further objective of the present invention to solve these problems together in a way that the art has thus far failed to appreciate. It is also an objective of the present invention to start with a database of information about various consumer characteristics, demographic and other characteristics (collectively herein referred to as consumer "attributes") and to direct advertising messages to these consumers based on these known attributes. It is also an objective of the present invention to increase the number and type of known consumer attributes by recording how each individual consumer expresses his or her preferences over time. It is also an objective of the present invention to reward users of the Internet, World Wide Web and the like (collectively herein referred to as "consumers") for providing information about themselves by providing them in return with access to information which they desire. The present invention also rewards vendors of goods or services for disseminating information, while allowing these vendors to direct their advertisements to those consumers whom they believe are most apt to have an interest in their products or services. It is also an objective of the present invention to convey information and advertising messages to consumers based on information that is already known about the consumer or which the consumer voluntarily supplies about himself or herself. It is also an objective of the present invention to market to consumers in real time based on the information which they supply in real time.

The present invention achieves these objectives, and others, by creating or using, hereinafter referred to as "applying", a database having information which the consumer desires to know, a database containing attributes of the consumer, and a database of advertisements that the internet can deliver to that potential consumer. The database of consumer attributes can contain information that is already known about the consumer, information which the consumer supplies in response to questions, information gained by cross referencing the database with other databases, and information gained by observing the consumer's ongoing responses to advertising messages or hot link choices. Data links connect to the databases from the Internet site in any of a variety of ways such as hard wired, intranet or via the Internet. The consumer initiates activity by contacting the Web site. Software identifies the consumer via the consumer inputted identification and locates the known attributes of the consumer or receives attributes input by the consumer. Software uses these attributes to select an advertising message for the internet to transmit to the customer. The Internet is also used to disseminate the information sought by the customer (such as student grades). The customer has the opportunity to view the information and advertising message and, in the case of an offer, interactively respond to the advertiser's message by seeking additional advertising or by placing an order for the products or services of the sponsor.

The present invention has the particular advantage of permitting information to be distributed over the Internet which is otherwise too expensive to, for example, compile,

cross reference format, verify or disseminate freely. Advertisers and marketers wanting to target advertising messages to the consumer over the Internet pay part or all of the cost of dissemination. Consumers supply their personal attributes for use in the "virtual" world of "cyberspace" in many instances without their being required to divulge their actual identities. The ability of advertisers and marketers to better direct advertisements to those customers who are most interested in the product or service being sold has great value to advertisers and marketers. Similarly consumers benefit because they perceive value in receiving advertisements or offers for the products or services which they may reasonably be expected to have an interest in purchasing. And consumers can avoid the advertising messages entirely simply by not logging on to the Web site.

One application of the present invention is in distributing grade reports to students. Students generally want to know their grades promptly at the end of every semester. Universities have the problems and costs associated with getting this information to students. The Internet is a natural vehicle for disseminating grade information. Universities know many attributes of their students. These attributes have value to advertisers and marketers. For example, a university will know the sex, age, year in school, major course of study, address and additional attributes. Advertisers and marketers are able to direct advertisements to students based on these known attributes or on additional student provided attributes with or without knowing the true identity of the person. For example, a consumer electronics company can market to engineering majors only, by advertising the

price or opportunity to order, a specialized engineering calculator. Also, female oriented products can be marketed to females only. Advertising revenues can be used to offset the price of creating the Web site and of updating and disseminating the grade reporting information. The present invention can be used to disseminate any type of information.

The features necessary to implement the present invention include a database of attributes of particular individuals. Attributes can already be known, residing in the database or can be supplied by the consumer, gleaned by observing the responses to advertising messages or hot link choices, by cross referencing other databases, or by any combination of these methods. The consumer can be assigned a password or similar identification which identifies his or her attributes. The consumer's attributes, however derived, must then be used to quickly and accurately select an advertisement of interest to the individual consumer. The sorting process needs to be flexible so as to accommodate the different interests of particular advertisers and marketers fast enough that consumers are not annoyed by any delay. The link between the attributes of a given internet user and their true identity can be secured so as to maintain the privacy of the individual if such privacy is desired or required.

It is advantageous to maintain a record of the attributes of consumers who access a particular database so that advertisers and marketers have assurance that their advertising messages are being targeted to those consumers who are most apt to have an interest in an advertisers and marketers goods or services. It is also advantageous to record how

many times a particular advertising message meets the desired target audience. These advantages are easily obtained with the present invention.

The foregoing objectives, features and advantages of the present invention, and others in addition, are illustrated below with the aid of the drawings and detailed description.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows one embodiment of the present invention in which an Internet user accesses databases at a given Web site.

Figure 2 shows one way to deliver information in accordance with the present invention.

Figure 3 shows an alternate embodiment of the present invention in which a consumer can interact directly with an advertiser or marketer.

Figure 4 shows a way of evaluating consumer attributes so as to select an advertisement to be displayed in Figure 2.

Figure 4B shows more detail for creating the software for evaluating consumer attributes.

DETAILED DESCRIPTION

Figure 1 shows three databases 1-3 connected to a Web site 4. The databases 1-3 may be physically resident on one or more servers at the Web site. The selection of servers for the databases are deemed to be within the level of skill of one of ordinary skill in the art. Alternately, one or more of the databases may be located remote from the Web site and connected thereto over a suitable connection such as high speed fiber optic cable, telephone line, local area network (LAN), intranet, Internet, or World Wide Web. The Web site 4 is connected to the Internet, or World Wide Web, at a node 5. This node is a part of the general information transfer network, such as the Internet or World Wide Web, which comprises symbolically a series of interconnected nodes 100, 101, 102, 103, 104, 106 in a manner known in the art. This interconnection is referred to herein as the "Internet" for simplicity since the distinctions among the Internet, the World Wide Web, and various "intranet", LANs and the like is not critical.

As shown in Figure 1, database 1 contains a type of information which the consumer 6 who is using the Internet desires to access. The consumer 6 contacts Web site 4 through the Internet in a manner that is well known in the art. Upon accessing the Web site 4, software resident in the Web site 4 identifies the consumer 6 in a database of known users. This identity preferably comprises attributes of the consumer's "real" world identity. These can include, *inter alia*, information about the consumer which is already known, information which the consumer voluntarily supplies, information which is gleaned from the

consumer's responses to advertising messages or hot link choices while visiting this or other Web sites, information on the consumer's present or past responses to advertisements and offers, and information gleaned by cross referencing any of the foregoing information with other sources such as magazine subscriptions, credit card approvals, census data, etc. The attributes database includes a variety of characteristics, tastes, preferences, and other information unique to the consumer 6, including, for example, the age, sex, weight, height, residence, income level, and other group interest or personal preference. These individual characteristics are referred to herein as "attributes" with the understanding that such attributes can include any information pertaining to what makes a person a unique individual.

Software uses the attributes of the consumer 6 to select an advertisement loaded in database 3 as explained below. The Internet then transmits the selected advertisement or offer from database 3 and the information contained in database 1, either sequentially or simultaneously, to the consumer 6. The manner of information transmission can comport with any of several standard publishing protocols for the Internet and is considered to be within the level of skill of one of ordinary skill in the art.

Figure 2 shows one way of displaying the information from databases 1 and 3 to the consumer 6. The advertising message from database 3 is shown as being displayed in area 123. The information from database 1 is displayed in the area indicated as 121.

The advertising message in area 123 may comprise a separate screen. Alternately, the advertising message in area 123 can be displayed simultaneously with the information in area 121. The simultaneous display of the information with the advertising message is thought to reduce the chance of the consumer simply flipping to the next screen of information and is therefore considered preferable. As shown in Figure 2, the advertisement area 123 both precedes and follows the display of the information 121 in contemplation that the information area 121 will be larger than a single screen.

It is contemplated that the consumer 6 will desire the information contained in area 121. It is therefore considered desirable to keep the advertising message displayed in area 123 limited so as not to become annoying.

It is possible that the information sought by the consumer 6 will occupy more than a single screen. In such an instance, the consumer 6 will need to scroll to additional screens. It is therefore possible to display advertising message 123 again for each screen of information in area 121. The advertising message area 123 may contain the same information in each screen. In addition, however, the advertising message area 123 can be used to display other advertising messages selected by the software at the Web site 4. In this way the consumer 6 can receive multiple advertising message at the same time as he or she receives the desired information in area 121. This result is achievable by displaying a different advertisement each time the Internet transmits a different screen to the

consumer. It is desirable that the ads be selected so as to minimize, or avoid entirely, repeating any one advertising message to the consumer 6.

Figure 3 shows another way to implement the present invention. The databases 1-3, Web site 4, consumer 6 and Internet connection nodes 5, 100, 101, 104, 106 are the same as shown in Figure 1. In addition, however, additional Internet connections have been established at 7-9 representing vendor V_1, V_2, ...V_N. The vendors are connected through nodes 107, 108 and 109, respectively. It is contemplated that these nodes will be standard Internet connections, the design of which lies within the level of a person of ordinary skill in the art. The consumer 6 can click on link text 124 in Figure 2 so as to directly access the Web site of the vendor supplying the advertisement in space 123. In this way the consumer 6 can be put in direct contact with a vendor offering goods or services of interest to the consumer 6.

As shown in Figure 3, the consumer 6 accesses the vendor's V_1-V_N over the Internet in the same manner as the consumer accesses the Web site 4 containing the desired information. It is to be appreciated that this is only one of many possible embodiments of the present invention. For example, one or more of the vendors could be resident at the Web site 4.

Figure 4 illustrates one way of ascribing attributes for the purpose of selecting an advertisement to be displayed. The consumer 6 has 10 attributes 401-410. These

attributes represent codes responses attained or gleaned from any of the information sources identified above. These attributes can be of any number but are illustrated here as being 10 in number. When the consumer is identified at the Web site 4, these 10 exemplary attributes are recalled from the database 2 so as to be used in computing which ad to display. As illustrated in Figure 4, the advertiser 7 screens the 10 attributes at decision steps 411-420. These attributes can then be scored and totaled at step 451 according to weights established by vendor 1. Vendors 8 and 9 go through a similar process. However, as illustrated, vendor 8 has a filter employed at steps 421 and 425 such that this vendor's advertisement will not be played to certain consumers. Likewise, vendor 9 has a different set of filter decision steps 432 and 437-439. The total scores for each of the vendors from steps 421-430 and 431-440, respectively, are totaled at steps 452 and 453, respectively. The combined scores from the various vendors are then ranked and ordered at decision step 454 to determine the advertisement to be displayed in space 123 in Figure 2. In this way it is possible for a vendor to select a particular advertisement to direct to the consumer 6 according to that consumer's attributes.

One example of a database assembled according to Figure 4 is for students inquiring of their semester grades. A university knows a considerable number of attributes regarding individual students as described above. These attributes can be coded and used to select among possible advertising messages so as to display to the student an ad of greatest possible interest.

Matching Web site consumers to particular advertising messages is a "human intelligence" task that is not easily coded as database queries. The problem of assigning many ads to several hundred thousand potential consumers is arduous. In addition, the attributes of the consumers are often not easily obtainable in a timely manner. Consequently, a tool to assist an advertiser or direct marketer in assigning ads to students in a grade reporting system is essential and should be capable of providing the capabilities listed in the following table.

Requirement Name	Capability
Customer Ad Limits	1. The ability to limit the number of ads that can be assigned to each student.
Student Counts	1. The ability to count the number of customers with a specific set of selects. For example, the ability to count the number of customers from 4 year private schools who are male freshman. 2. The ability to graphically display distributions of customer selects. For example, display a pie chart distribution of the customers by attributes and gender. This would be a visual way to verify a uniform distribution of customers in the population. Another example would be to display the distribution of students by school type.
Customer Ad Counts	1. The ability to count the number of customers who have a particular number of ads assigned t them. For example, it may be desirable to count the number of customers who have 3 or fewer ads assigned

	to them. 2. The ability to graphically display the distribution of the number of ads assigned to each customer.
Customer Ad Distributions	1. The ability to graphically display the counts and distribution of ads across the customer population.
Customer Ad Assignment	1. The ability to assign an ad or list of ads to customers with a particular set of selects. 2. The ability to assign an ad or list of ads to customers based on the number of ads already assigned.
Customer Ad Deletion	1. The ability to remove an ad or list of ads from a group of customers defined by a particular select set. 2. The ability to remove an ad from a list of customers who have a particular number of ads assigned to them.
Customer Ad Dump	1. When the ad selection process is completed, the ads for each customer shall be dumped to a database file so that the attributes can be placed on the Ads Database Server on-line without service interruption.

This is an exemplary list of the requirements for one selecting an ad to display over the internet. The design of the tool used to implement this configuration is exemplary.

One important consideration is the amount of time that is required to deliver the message to the consumer. The delay involved in the round trip to the consumer is preferably be no longer than 2 seconds. It is undesirable to keep a customer waiting longer for a longer period of time while computing the next ad to play. Also, a lengthy delay will

break the flow the introduction to the advertising message. Therefore, in the event that the server for the database of advertisements does not respond within the specified period of time, the server supplying the advertising messages on database 2 can display a default message. Maintaining a sufficiently rapid turn around is a function of the server being used, the selection of which is within the level of skill of a person of ordinary skill in the art.

Once a consumer decides to review an advertising message, that message need no longer be offered to that same consumer. However, the advertising message database 2 can display messages to the consumer even if the consumer has received the messages previously but did not respond to it. Advertising messages may also involve a hypertext link to the vendor's server or simply display a toll-free ("800") number or a local call to call. This feature can be designed into an the advertising message area 121.

The selection algorithm can be implemented using Windows NT since it provides the capability of connecting to networks, scaleable processing and ease of connectivity to many machines running server software. This approach allows an NT database server to be migrated across many different platforms. Consequently, the computer system running the NT SQL server need not remain the same as the demands on the server grow.

There is no limit necessarily to the number of lines web site visits that the server supporting advertising message database 2 can simultaneously support. There are several reasons for this. The advertising message database 2 server supports all users that are

necessary to support the number of consumers who are concurrently on-line. The server for database 2 can be designed to be scaleable in both hardware and software. It should be possible to handle thousands of simultaneous log-ons.

Figure 4B shows how software written for an interactive voice response system can be seamlessly adapted to the internet application described and claimed herein. Additional specifications and requirements for preparing the software are attached as the appendix to this provisional patent application.

It is to be appreciated that other databases could be constructed using any set of attributes. For example, the database 2 could be used to comprise a form of home shopping system in which consumers filled out a questionnaire in exchange for receiving potentially interesting advertisements. Such a system would offer a great advantage over the conventional television shopping programs and networks. Likewise, the first information contained in database 1 could comprise any form of information of interest to consumers. This information could include newspaper articles, movie listings, or vocational and technical information. The advertisements displayed can be adopted in real time to correspond to the consumer's browsing and purchasing decisions. Likewise, the type and level of detail of the information displayed in area 121 could be adapted to take into account the consumer's purchasing decisions, thereby rewarding better customers with more of the information which they seek.

The principles, preferred embodiments and modes of operation of the present invention have been set forth in the foregoing specification. The embodiment disclosed herein should be interpreted as illustrating the present invention and not as restricting it. The foregoing disclosure is not intended to limit the range of equivalent structure available to a person of ordinary skill in the art in any way, but rather to expand the range of equivalent structures in ways not previously thought of. Numerous variations and changes can be made to the foregoing illustrative embodiments without departing from the scope and spirit of the present invention as set forth in the appended claims.

WHAT IS CLAIMED IS:

1. A method of directed advertising over the internet, comprising:

applying a first database of information at a web site,

applying a second database having a multiplicity of attributes which are unique to a given individual,

applying a third database of a plurality of advertising messages that are transmittable over the internet,

linking the first, second and third databases to the web site,

receiving a visit to the web site over the internet from an individual,

determining the identity of the individual in the second database,

culling attributes for the individual from the second database based on their identity,

selecting a message based on the culled attributes,

transmitting the selected message to the consumer over the internet, and

transferring the information to the consumer over the internet.

2. A method of directed advertising over the internet as claimed in claim 1, further comprising:

(i) selecting an additional advertising message based on the culled attributes,

(ii) transmitting the additional advertising message to the consumer over the internet,

(iii) transferring additional information to the consumer over the internet, and

(iv) repeating steps (i)-(iii).

3. A method of directed advertising over the internet as claimed in claim 2, wherein each additional advertising message differs from advertising message previously transmitted.

4. A method of making offers over the internet, comprising:

creating a first database of information at a web site,

creating a second database of demographic information having a multiplicity of attributes for each of a plurality of individuals, each individually having an identity,

creating a third database of a plurality of advertising messages that are transmittable over the internet,

the third database further including a vendor link for contacting over the internet a vendor sponsoring the advertising message,

linking the first, second and third databases to the web site,

receiving a visit to the web site over the internet from an individual,

determining the identity of the individual in the second database,

culling attributes for the individual from the second database based on their identity,

selecting an advertising message based on the culled attributes,

transmitting the selected message to the consumer over the internet,

transferring the information to the consumer over the internet,

transmitting the vendor link over the internet, and

connecting the consumer to the vendor when the consumer activates the vendor link.

5. A apparatus for directed advertising over the internet, comprising:

means for applying a first database of information at a web site,

means for applying a second database having a multiplicity of attributes which are unique to a given individual,

means for applying a third database of a plurality of advertising messages that are transmittable over the internet,

means for linking the first, second and third databases to the web site,

means for receiving a visit to the web site over the internet from an individual,

means for determining the identity of the individual in the second database,

means for culling attributes for the individual from the second database based on their identity,

means for selecting a message based on the culled attributes,

means for transmitting the selected message to the consumer over the internet, and

means for transferring the information to the consumer over the internet.

6. An apparatus for directed advertising over the internet as claimed in claim 5, further comprising:

(i) means for selecting an additional advertising message based on the culled attributes,

(ii) means for transmitting the additional advertising message to the consumer over the internet,

(iii) means for transferring additional information to the consumer over the internet, and

(iv) means for repeating steps (i)-(iii).

7. An apparatus for directed advertising over the internet as claimed in claim 6, wherein each additional advertising message differs from advertising message previously transmitted.

8. An apparatus for making offers over the internet, comprising:

means for creating a first database of information at a web site,

means for creating a second database of demographic information having a multiplicity of attributes for each of a plurality of individuals, each individually having an identity,

means for creating a third database of a plurality of advertising messages that are transmittable over the internet,

means for including in the third database a vendor link for contacting over the internet a vendor sponsoring the advertising message,

means for linking the first, second and third databases to the web site,

receiving a visit to the web site over the internet from an individual,

means for determining the identity of the individual in the second database,

means for culling attributes for the individual from the second database based on their identity,

means for selecting an advertising message based on the culled attributes,

means for transmitting the selected message to the consumer over the internet,

means for transferring the information to the consumer over the internet,

means for transmitting the vendor link over the internet, and

means for connecting the consumer to the vendor when the consumer activates the vendor link.

9. An apparatus for making offers over the internet as claimed in claim 8, further comprising:

(i) means for selecting an additional advertising message based on the culled attributes,

(ii) means for transmitting the additional advertising messages to the consumer over the internet,

(iii) means for transferring additional information to the consumer over the internet, and

(iii) means for repeating steps (i)-(iii).

10. An apparatus for making offers over the internet as claimed in claim 9, wherein each additional advertising message differs from advertising message previously transmitted.

ABSTRACT OF THE DISCLOSURE

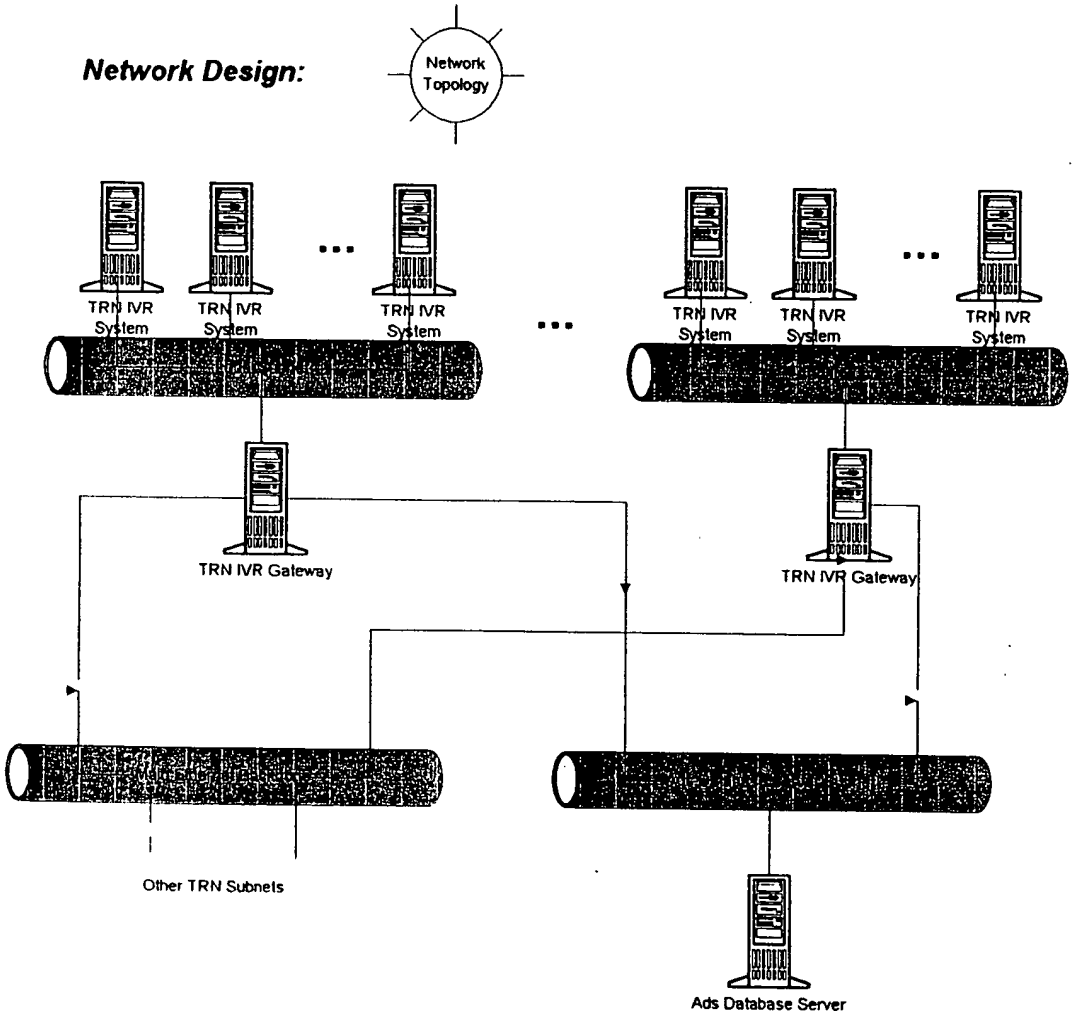
A database having information which the consumer desires to know, a database containing attributes which are personal to the consumer, and a database of advertisements or offers which can be transmitted to the consumer over the Internet are linked to a Web site. Software resident at the Web site reads the identity of the customer who is accessing the Web site and recognizes and ascribes various attributes to the customer. Software uses these attributes to select an advertisement which the internet then transmits to customer. The internet also transmits information sought by the customer. The customer has the opportunity to either view the information or, preferably, interactively respond to the advertisement or offer by seeking additional advertisements or by placing an order for the products or services of the sponsoring vendor.

SOFTWARE

APPENDIX

Ads Server Database Design

Network Design:



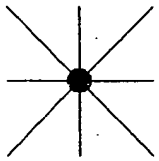
NOTES:

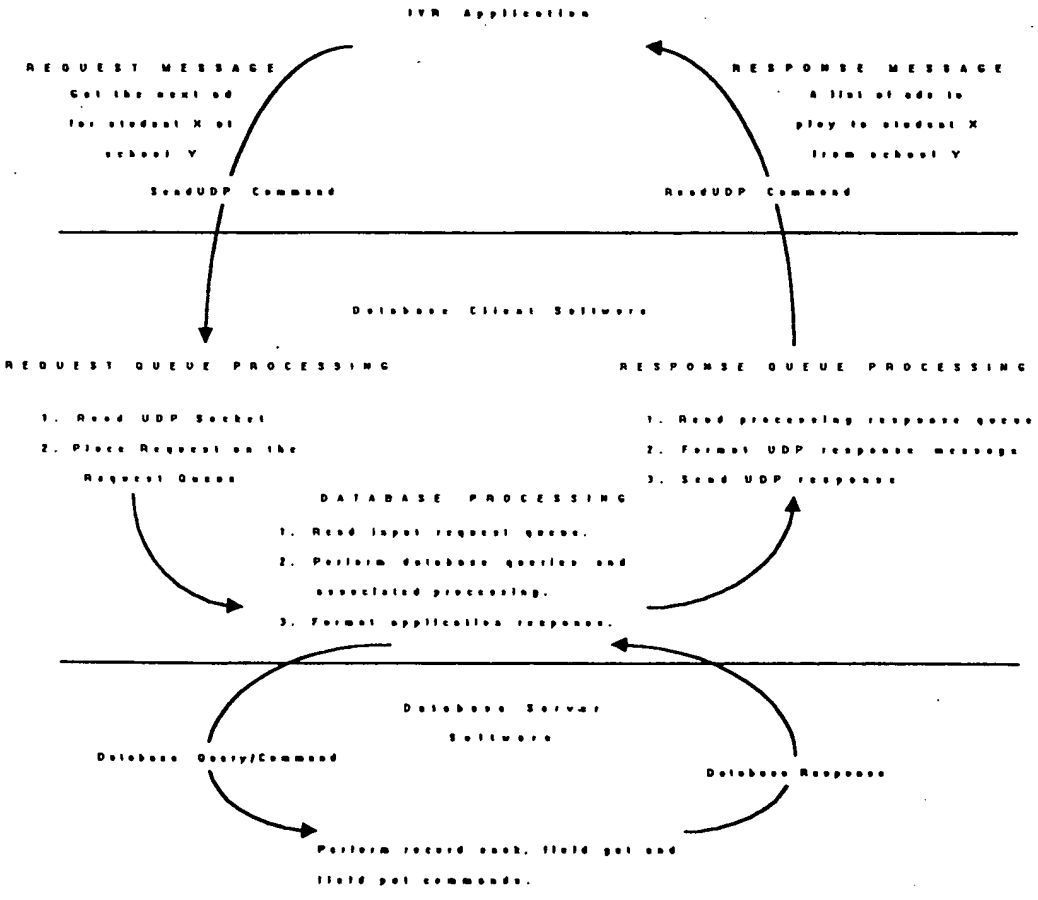
1. The network configuration above is a potential candidate. It is being propsed to eliminate an excessive load on the Ethernet Backbone.

2. This requires the IVR Gateway systems to possess three Network Interface Cards (NICs). This should not be a problem since the Gateway systems do not need to be IVR capable.

3. The Ads Server Database subnet could be run at 100 Mbits/sec as the number of ports increases with new schools being brought on-line.

Distributed Processing Architecture:

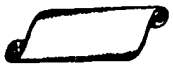




NOTES:

1. The SendUDP and GetUDP commands are Apex records that executed from within the Grade Reporting or Course Registration application.
2. The Database Client software will run on the IVR Gateway systems.
3. The Database Server software can run on a single IVR Gateway system and be migrated to full client server as the needs of the IVR TRN grow.
4. Each IVR location can make a request from the ADSERVER host. Each IVR system can designate the ADSERVER host name to its designated IVR Gateway system. Hence, network maintenance is removed from the Apex IVR application.

IVR Request & Response Messages



IVR TRN Application | **Ads Database Client/Server**

NEXTAD, SchoolCode, StudentId, MAds, AdTime

SchoolCode	4 digit School Id Code
StudentId	9 digit Social Security #
MAds	Maximum number of ads to play
AdTime	Maximum duration of ads played to the student based on particular school

NEXTAD, SchoolCode, StudentId, A[1], A[2], ... A[MAds]

SchoolCode	4 digit School Id Code
StudentId	9 digit Social Security #
A[1]	First ad to play.
A[2]	Second ad to play
...	
A[MAds]	Last ad to play

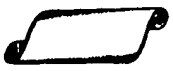
An Ad has the format SSSPPNNA. The ad list is to read by the IVR program until the end of line.

The message coming back from the Ads database server has the same preamble as the request message.

PLAYED, SchoolCode, StudentId, Date, Time, AdNums, Selected

SchoolCode	4 digit School Id Code
StudentId	9 digit Social Security #
Date	Date ad was played.
Time	Time ad was played
AdNums	SSSPPNNA ad played
Selected	Student response to ad

IVR Request & Response Messages



NEXTAD and PLAYED are keywords to be decoded by the Ads Database Server.

The NEXTAD message contains the maximum number of ads, MAds, that can be played within the specified ad play interval, AdTime. The AdTime is specified in the contract with the particular university. If MAds is 3, AdTime is 60 and there are 4, 15-second ads that can be played in the 60 second ad slot, only 3 ads will be returned because MAds is the overriding control number.

The ads that are returned from the Ads Database Server have the format SSSPPMMA. Each field is defined below:

S S S	-	Three digit sponsor code. There are 1000 potential sponsors.
P P	-	The sponsor product code. Identifies the particular product(s) being offered.
M M	-	The particular ad being offered for the particular product.
A	-	The particular ad split number for the ad being offered.

The format above identifies sponsors and products. The ad (i.e. MM) variability allows different ads to be played to different students. The split number (i.e. A) provides the ability to implement A/B split testing and/or bot swapping of ads.

The PLAYED message contains the information needed to maintain a single, controlled ad play and take database. There will be 1 PLAYED message for each ad played to a student. One NEXTAD response may generate several PLAYED messages from the IVR application.

Note, both the play and the take information is contained in the PLAYED message. The format of this message implies that only initial interest statistics can be gathered from this file. For example, for a Discover Card application, the PLAYED message will contain only that the student either had an interest in obtaining a Discover Card, or that the student successfully filled out the on-line application. Whether or not, the student application can be successfully transcribed and/or fulfilled is another issue that is separate from this type of record keeping.

Because the ad play and take information is in a single file, the reporting time for statistics will be significantly reduced and the preprocessing simplified.

Sever Database Files:

Student Ads Database:

Field Name	Type	Size	Description
SCHCODE	Character	4	4 digit school code
SOC_SEC	Character	9	9 digit student ID number which is most often a social security number.
ADLIST	Character	120	List of ads that can be played to this student.
PLAYLIST	Character	120	List of ads that have been played to the student.
TAKELIST	Character	120	List of ads that the student has taken during the current period of operation.

NOTE: Records indexed on SCHCODE+SOC_SEC.

Ad Selection Database:

Field Name	Type	Size	Description
SPCODE	Character	3	3 character sponsor code.
PRCODE	Character	2	2 character sponsor product code that identifies a particular product or service.
ADCODE	Character	2	2 character ad code that identifies a particular ad for a sponsor product.
SWAPLIST	Character	20	A list of 10, 1 character ad swap numbers to perform split ad testing.
COUNT	Numeric	5.0	The maximum number of times the ad can be played.
NPLAYS	Numeric	5.0	The number of times that this ad has been played.
CATEGORY	Character	40	The ad category used to determine competing ads.
DURATION	Numeric	4.0	The duration of this particular ad.

NOTE: Records indexed on SPCODE+PRCODE+ADCODE

Ads Server Database Design

Sever Database Files:

Ad Play Database

Field Name	Type	Size	Description
SPCODE	Character	3	3 character sponsor code.
PRCODE	Character	2	2 character sponsor product code that identifies a particular product or service.
ADCODE	Character	2	2 character ad code that identifies a particular ad for a sponsor product.
ADNUM	Character	1	A list of 10, 1 character ad swap numbers to perform split ad testing.
DATE	Character	8	Date of the ad play.
TIME	Character	8	Time of the ad play.
SCHCODE	Character	4	The student's school code.
SOC_SEC	Character	9	The student's 9-digit id code
SELECTED	Character	1	The student's selection for the ad. A "0" indicates that the ad was not taken by the student.

NOTES:

1. The file is unindexed.

2. The SELECTED field contains press ad take information. In the case of a credit card ad, the SELECTED field set to "1" may indicate student interest in having the card, or a "1" may indicate a completed application over the phone. The SELECTED field will not indicate that the application has been successfully transcribed.

Ads Server Database Design

Sever Database Files:

Student Ads Database Notes:

The Student Ad Database contains a record for every student from every school.

The AdList field contains a comma delimited list of ad names of the form SSSPPAA. The ads are in priority order.

The PlayList field contains a comma delimited list of ad names of the form SSSPPAA. The entries in the list are in the order in which they were played to the student.

The TakeList field contains a comma delimited list of ad names of the form SSSPPAA. The entries in the list are in the order in which they were taken.

Ad Selection Database Notes:

The Ad Selection Database is indexed on SPCODE+PRCODE+ADCODE.

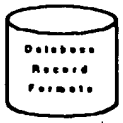
The SWAPLIST field is a comma delimited list of swap numbers. If there is no split testing required, there will only be one item in the list.

To "hot-swap" an ad, a new ad can be created with a new text character. The Ad Selection Database can be changed such that the SWAPLIST field can be changed to the new text character. Ad changes can be made without changing the Student Ads Database.

The CATEGORY field is a list of competitor categories. Most of the ads will not require a category list. BEWARE: Using category codes for every sponsor and product and ad may yield unanticipated results. For example, two USB ads will have the same category and will not be able to reside in the same ad play window of opportunity. While it is true that the sponsor codes can be compared, this is one more level of comparisons that may render this algorithm useless.

Ads Server Database Design

Sever Database Files:



Ad Play Database Notes:

The Ad Play database is unindexed. Records are appended as the IVR application PLAYED messages are received and processed.

There are separate fields for SPCODE, PRCODE, ADCODE and ADNUM. This will allow ad response statistics to be computed based on Sponsor, Sponsor and Product, a particular ad(s) for a particular sponsor's product, etc.

The SELECTED field indicates the student's response to the ad. If the student negatively responds to an ad, a field value of "0" will be recorded.

Ads Server Database Design

NEXTAD Algorithm

Inputs:

SchoolCode	-	4 digit code identifying students school.
StudentId	-	9 digit code identifying student
NAds	-	Maximum number of ads to play.
AdTime	-	Maximum ad play time for this phone call.

Local Variables:

AdList	-	Contains the contents from the ADLIST field in the Students Ad Database
PlayList	-	Contains the contents from the PLAYLIST field in the Students Ad Database
TakeList	-	Contains the contents from the TAKELIST field in the Students Ad Database
ToPlayList	-	List of ads that can be played to the student.
UnPlayedList	-	List of ads from AdList that have not already been played to the student.
PlayedList	-	List of ads from AdList that have already been played but not taken by the student.
CurrAd	-	Current ad under consideration.
ReturnAdList	-	List of ads to be played to the student.
CategoryList	-	List of ad categories that are already in the ReturnAdList. Use of categories will prevent competing products to be played within the same student call.
TotalAds	-	The total number of ads that are currently contained in ReturnAdList
PlayLength	-	The total amount of ad play time for ads currently contained in ReturnAdList

Functions:

PushTail(List, Item)

Adds an "Item" to the end of a comma delimited "List". For example, PushQueue("1,2,3", "4") will result in the list "1,2,3,4".

PopTail(List)

Returns the last item from the end of a comma delimited "List" and removes the item from the end of the "List".

PushHead(List, Item)

Adds an "Item" to the head of a comma delimited "List". For example, PushHead("1,2,3", "4") will result in the list "4,1,2,3".

PopHead(List)

Returns the first item from the top of a comma delimited "List" and removes the item from the top of the list.

Ads Server Database Design

NEXTAD Algorithm

Functions (Cont'd)

ContainedIn(ItemList, List)

Returns TRUE if any item in "ItemList" is contained in "List". "ItemList" is a comma delimited list as is "List". If either "ItemList" or "List" are NULL, FALSE is returned. If no elements of "ItemList" are contained in "List" FALSE is returned.

Psuedo-Code:

```
Student Ads Database: seek for SchoolCode +StudentId
if not found
    return NULL ad string.
endif

Put field ADLIST into AdList.
Put field PLAYLIST into PlayList
Put field TAKELIST into TakeList

Set UnPlayedList to NULL
Set PlayedList to NULL
Set CurrAd to PopHead( AdList)

while CurrAd is not NULL
    if ContainedIn( CurrAd, PlayList )
        if NOT ContainedIn( CurrAd, TakeList )
            PushTail( PlayedList, CurrAd)
        endif
    else
        PushTail ( UnPlayedList, CurrAd)
    endif
    Set CurrAd to PopHead( AdList )
endwhile


Set ToPlayList to UnPlayedList + PlayedList
```

Ads Server Database Design

NEXTAD Algorithm:

```
Set RotorAdList to NULL
Set CategoryList to NULL
Set CurrAd to PopHead(ToPlayList)
Set TotalAds to 0
Set PlayLength to 0

while CurrAd is not NULL and TotalAds < MAds

      Ad Selection Database: seek for CurrAd
      if record found
            Set SwapList to SWAPLIST field
            Set PlayLimit to COUNT field
            Set NumPlays to NPLAYS field
            Set CatCodes to CATEGORY field
            Set AdLength to DURATION field

            if NumPlays < PlayLimit and
               NOT CatInList(CatCodes, CategoryList) and
              PlayLength+AdLength < AdTime
                  Set SwapNum to PopHead(SwapList)
                  PushTail(SwapList, SwapNum)
                  Ad Selection Database: put SwapList into SWAPLIST field
                  Set AdToPlay to CurrAd + SwapNum
                  Append CatCodes to CategoryList
                  Increment TotalAds by 1
                  Increment PlayLength by AdLength
                  PushTail(RotorAdList, AdToPlay)
            endif
      endif

      Set CurrAd to PopHead(ToPlayList)

endwhile

return RotorAdList
```

Ads Server Database Design

PLAYED Algorithm:

Inputs

SchoolCode	-	*4 digit code identifying students school*
StudentId	-	*9 digit code identifying student*
Date	-	*Date when ad played to student*
Time	-	*Time when ad played to student*
AdName	-	*Ad (i.e. SSSPPNNA) played to the student*
Selected	-	*Student selection to the ad offer.*

Functions:

(See NEXTAD Algorithm)

Psuedo-Code:

Ad Play Database: append blank record
Set SPCODE field to substr(AdName,1,3)
Set PRCODE field to substr(AdName,4,2)
Set ADCODE field to substr(AdName,6,2)
Set ADNUM field to substr(AdName,8,1)
Set SELECTED field to Selected
Set DATE field to Date
Set TIME field to Time
Set SCHCODE field to SchoolCode
Set SOC_SEC field to StudentId

Ad Selection Database: seek substr(AdName,1,7)
Increment NPLAYS field by 1

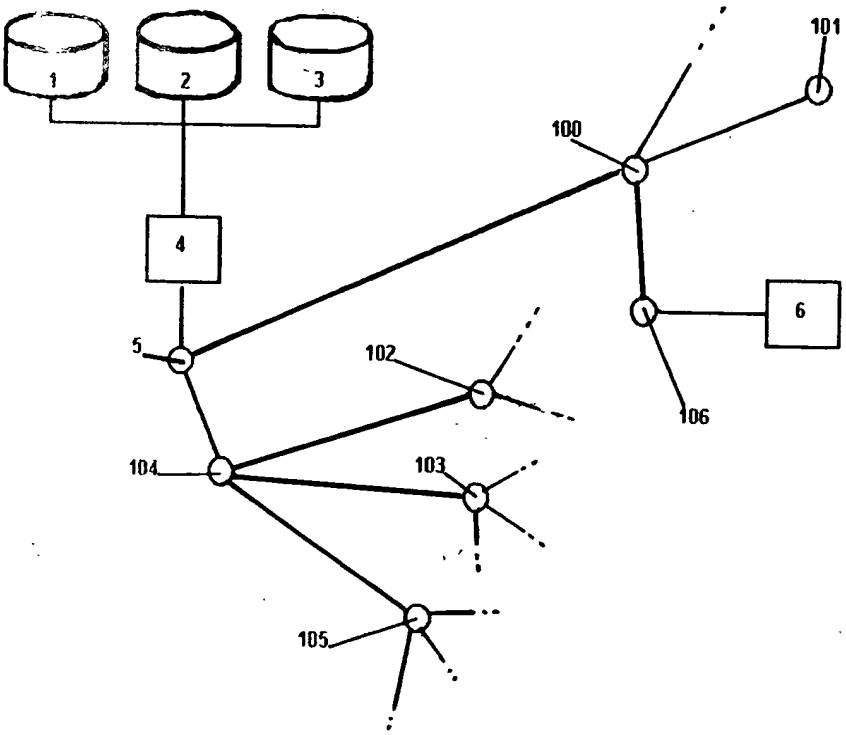


Figure 1

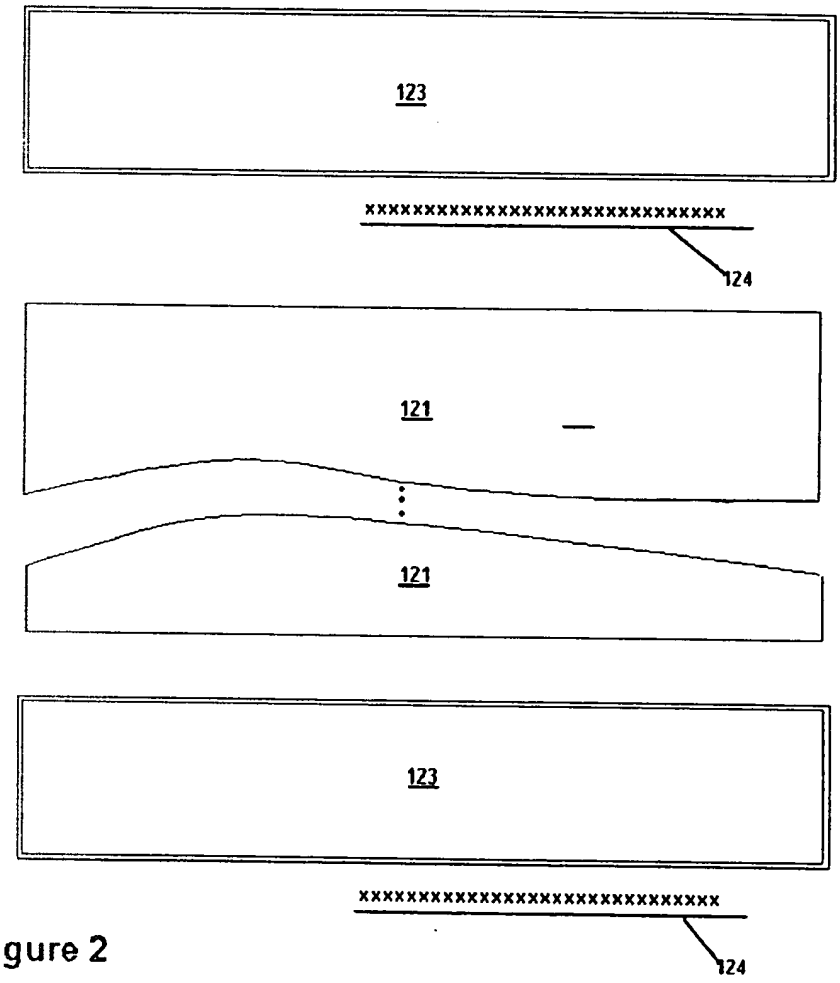


Figure 2

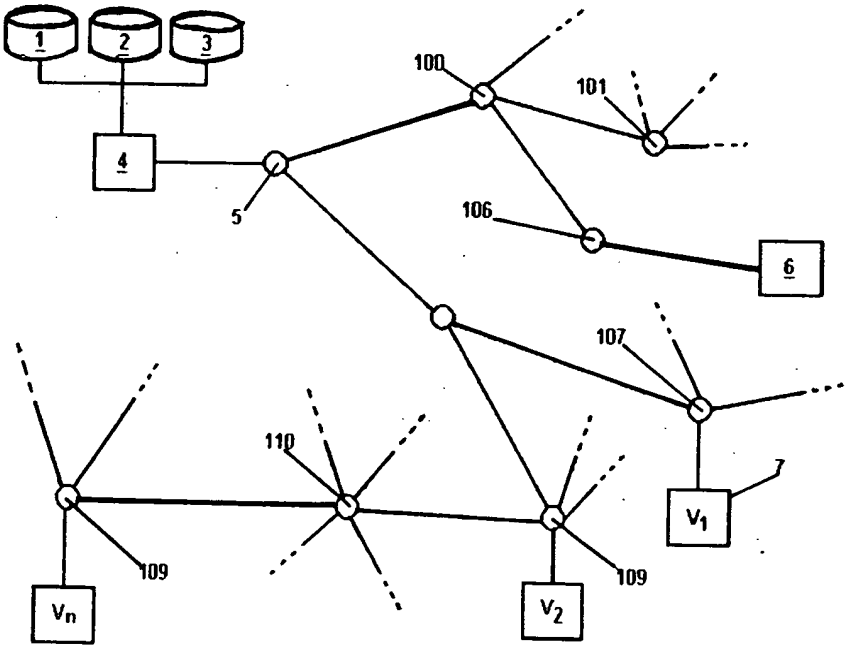


Figure 3

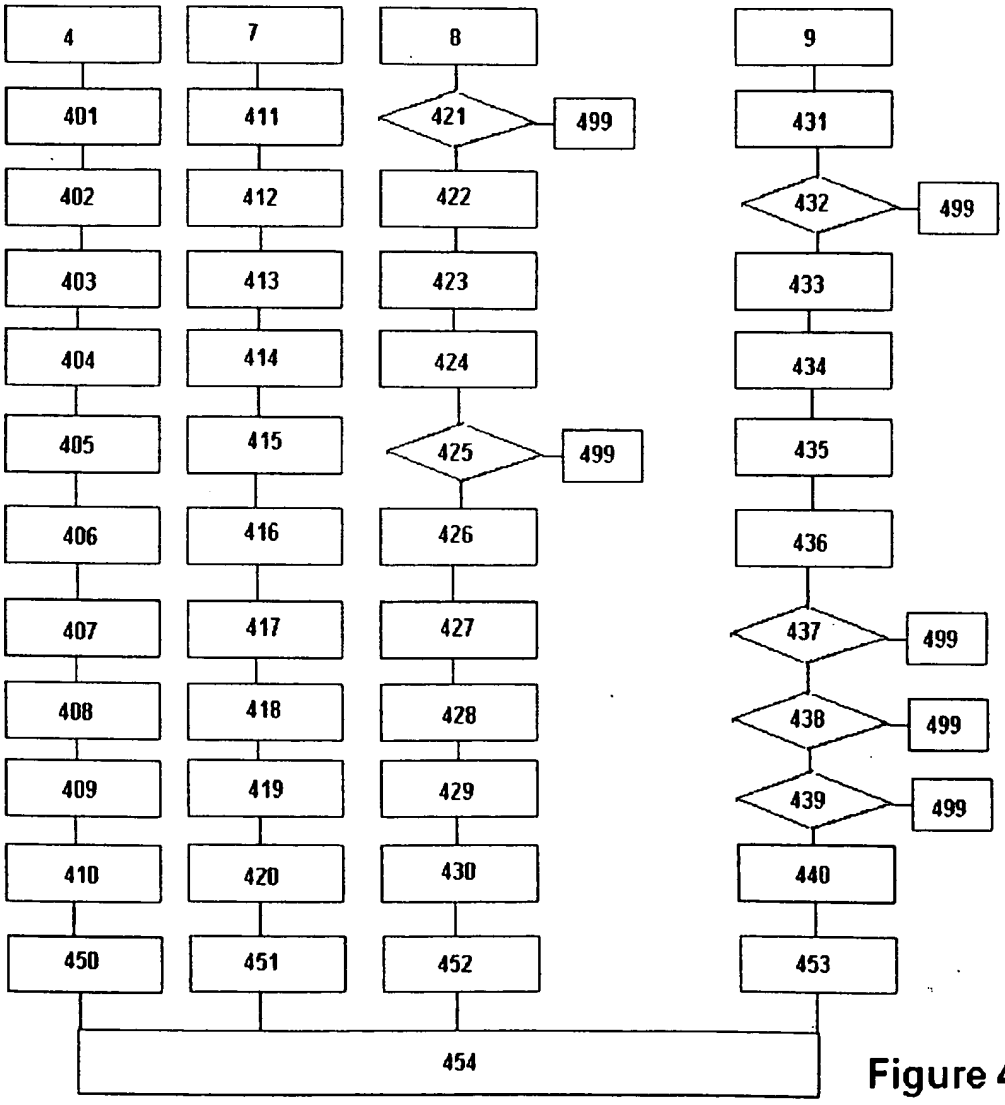

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Figure 4

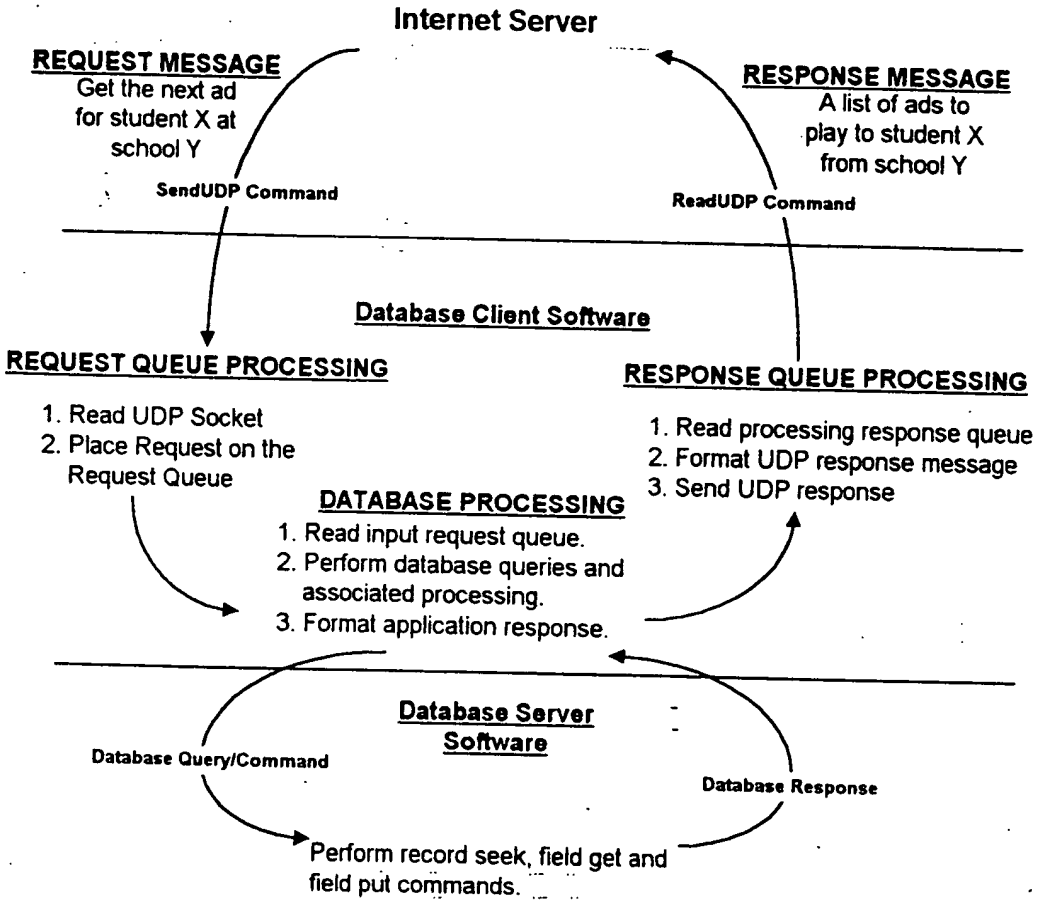
Internet Server
REQUEST MESSAGE
Get the next ad for student X at school Y
SendUDP Command
RESPONSE MESSAGE
A list of ads to play to student X from school Y
ReadUDP Command
Database Client Software
REQUEST QUEUE PROCESSING
1. Read UDP Socket
2. Place Request on the Request Queue
RESPONSE QUEUE PROCESSING
1. Read processing response queue
2. Format UDP response message
3. Send UDP response
DATABASE PROCESSING
1. Read input request queue.
2. Perform database queries and associated processing.
3. Format application response.
Database Server Software
Database Query/Command
Database Response
Perform record seek, field get and field put commands.

Figure 4B

60/023,258

The Ads Database Server Design

February 12, 1996

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1.0 Scope

This document will present the design of an Ads Database Server. The design meets the requirements that are defined in the ***"Ads Database Server Requirements"*** *dated February 1, 1996.*

This design provides for the following features:

- *Ad chains specified for each student.*
- *Dynamic, on-line ad chain modification*
- *Numeric limits on Ad plays.*
- *Dynamic on-line ad changes.*
- *A/B ad splits.*

This document is NOT concerned with what constitutes an ad or the process of how the ads are distributed to students. This design is solely concerned with "the mechanics of computing the next ad" to be played to a student.

1.1 What's in an Ad

While what constitutes an ad is not part of this design document, it is necessary to understand why. The Ads Database Server will receive a query: "What is the next Ad to play for Student X, where X is 9 digits, and school Y (where Y is the 4 digit company code)?" The Ads Database Server will return a six digit Ad number SSSSNN where SSSS is the sponsor code and the NN is the Ad number.

This is the identifier that will be returned to the IVR program. The SSSSNN ad can indicate a dBaseIV file, an APEX subcall or represent some pointer into a valid list of Ads. This defines the return message to the IVR routine.

1.2 How the Ads Get Distributed

The distribution of ads or "who gets to hear what ad?", is outside the discussion of the design of the Ads Server Database design, however, there is an interface with the Ads Server Database that must be maintained.

The marketing group in charge of TRN sponsorships will be responsible for computing what students hear what ads. The marketing group will receive the information outlined in Table 1 and generate the information contained in Table 2.

Table 1
Input to TRN Sponsorship Marketing Department

Record Field Name	*Description*
Company Code	*4 digit code representing the schoool.*
Student Id	*9 digit code identifying the student.*
*Student Selects**	*These are a list of characteristics that are provided by the school.*

NOTE: The student selects are provided by the school and are often incomplete. The customer service department is in charge of securing the appropriate information from the college MIS department. Often, if the information is incomplete, the university does not have complete information and is not capable of obtaining the information in a timely manner. Also, a category named "TRN responsive" will be one of the student selects. Currently, this is the number of times the student has responded positively to a sponsor offer. Whether this information is provided by the technical department or maintained by the marketing department is still in question.

Table 2
Output from TRN Sponsorship Marketing Department

Record Field Name	Description
Company Code	4 digit code representing the schoool.
Student Id	9 digit code identifying the student.
Ad List*	This is a list of ads to be played to the student in priority order.

NOTE: The information is table 2 is provided in dBase IV format. The list is a string of 120 characters with no embedded delimiter characters. Each field within the 120 character ad list is 6 characters wide with a format of SSSSNN. The SSSS is the sponsor id code and the NN is the ad identifier. The Ads Database Server will provide an ad or ads to the IVR application in the order of the ***Ads List***

The most important feature of the above discussion is that some form of an interface must exist between the technical and marketing departments. Changing interfaces without consent of both the technical and marketing departments will result in costly project delays.

2.0 The Ads Server Database Design

The Ads Server Database is graphically depicted in Figure 1 below. The design is intended to provide maximal control and thus provide the capability for achieving the maximum revenue. The ads listed in the Student Ads Database are product oriented (i.e. New York Times, Student Services Inc., Sports Illustrated and Time, etc.). The entries in the Ad Selection Database represent different presentations of the same product. The selection of one of the entries from the Ad Selection Database represents a single advertisement for a specific product.

The Ad Selection Database provides a "middle man" function of providing for the A/B split ad testing as well as providing numerical limits

on the number of plays for an ad. Without the Ad Selection Database, it is extremely difficult to manage ad response testing and limits on ad plays.

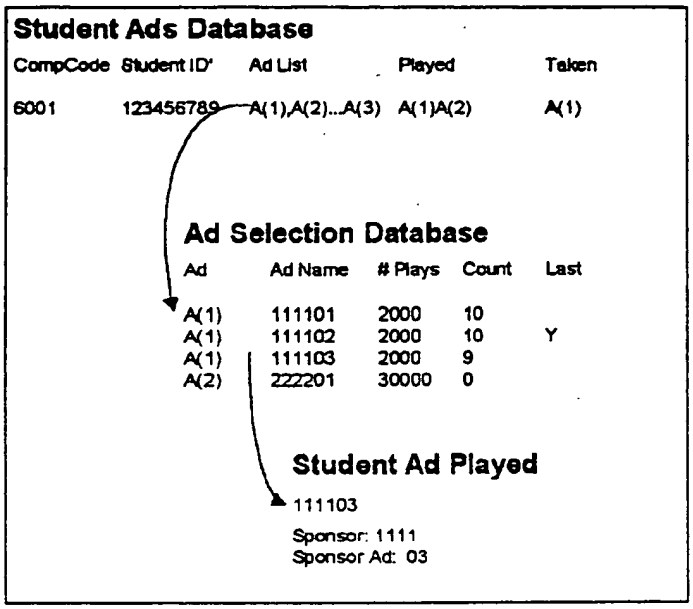


Figure 1 - Flow of Student Ad Selection

Note, the Ad Selection database must have at least 1 entry for the eacg product (i.e. A(1), A(2)....). The number of test ads is unlimited. Also note, the LAST field is used to mark the last ad selection from the database. To determine the next ad in a multiple ad selection, find the record where LAST="Y" and skip to the next valid record which may be itself if there are no other records in the database.

The database design above provides for ad play limits and an unlimited amount of split ad testing.

3.0 The Next Ad Retrieval Algorithm

Section 2 describes the logical relationship between the database files necessary to implement A/B split ad testing and ad play limits. The database architecture also supports "hot-swappable" ads. This is done by manipulating the contents of the Ads Selection Database. A new ad for an existing product can be immediately introduced without affecting the Student Ads Database.

This section describes a potential algorithm to select the next ad to play to a student. The algorithm will most likely be coded in C using CodeBase library routines. The algorithm will perform string manipulation in favor of database manipulation in order to achieve a high rate of "next ad" computations.

3.1 The Ad List

There is an Ad List for each student of each college. This list represents the ads that are to be played to that student. This list is computed off-line by the sponsorship marketing group and provided to the TRN technical group. The order of the ads in the list indicate the priority of the ad. There Ad List will contain 120 characters which equates to 20 separate ads.

3.2 The Played List

The played list indicates the last 20 ads that have been played to the student. If the Ad List has not been changed, the played list contains each and every product ad in the ad list as they were played to the student. The list is in reverse order. Starting from the left, the first ad in the play list (i..e. the first 6 characters) represents the most recent ad played to the student. The 21st ad played to the student, will shift the first ad off the end of the list, but again, if the ad list is not changed, the first ad will then occupy the first position in the play list.

3.3 The Take List

As the student takes offers for various products, the product ad will be stored in the take list. Any product ads that appear in the take list will not be presented again to the student unless the take list is cleared.

3.4 The Algorithm to Select the Next Ad

The algorithm to select the next ad to play to a student is described in Figures 2 and 3 below. The algorithm always begins at the start of the AdList. If the order of the ads is changed, the ad selection algorithm will consider each ad in priority order.

The algorithm provides for the case where all of the ads have been heard. In this instance, the list of played ads is searched in reverse to find the next ad that has not been taken and has not had its play limits exceeded.

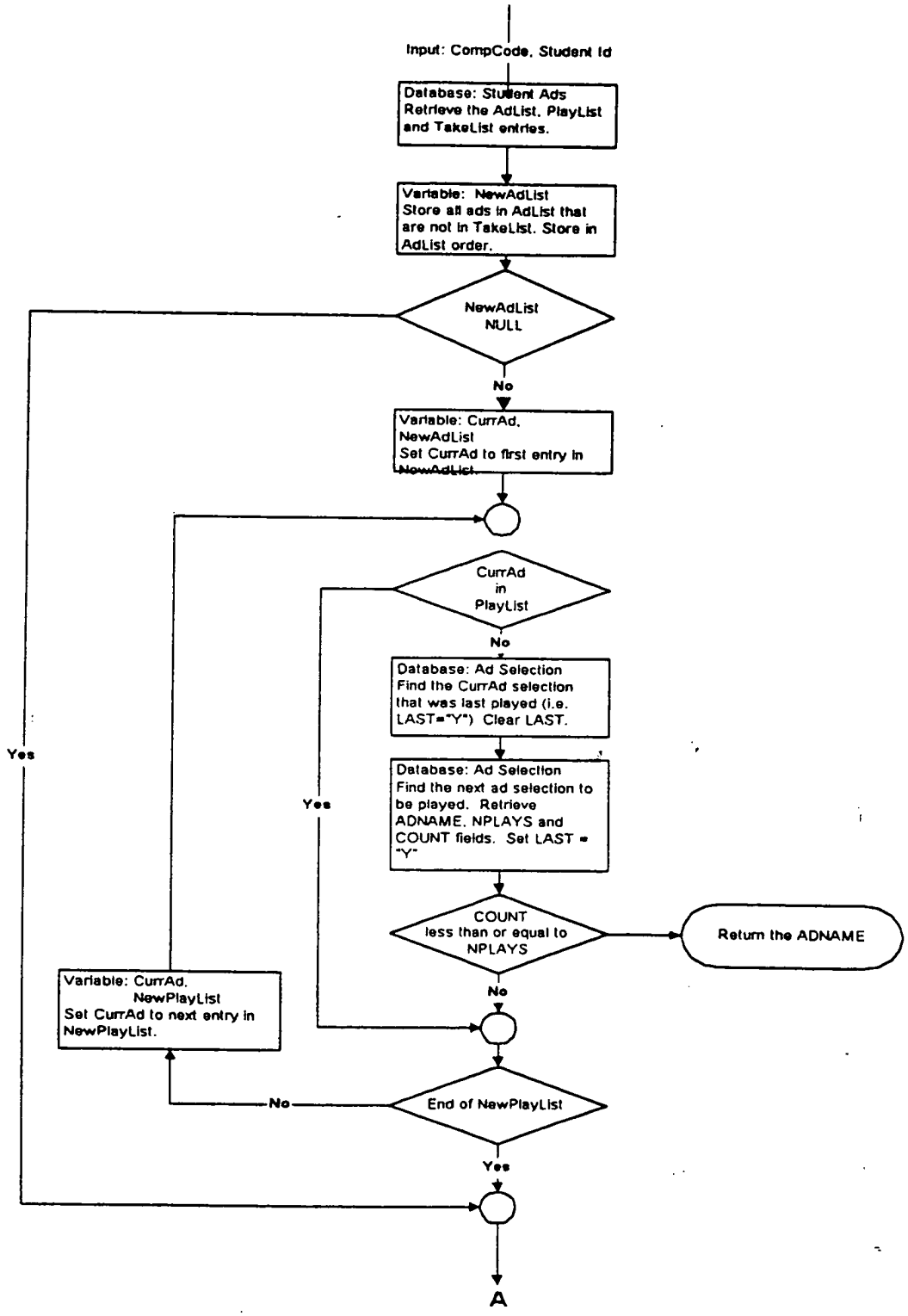


Figure 2 - Ad Selection Algorithm Part 1

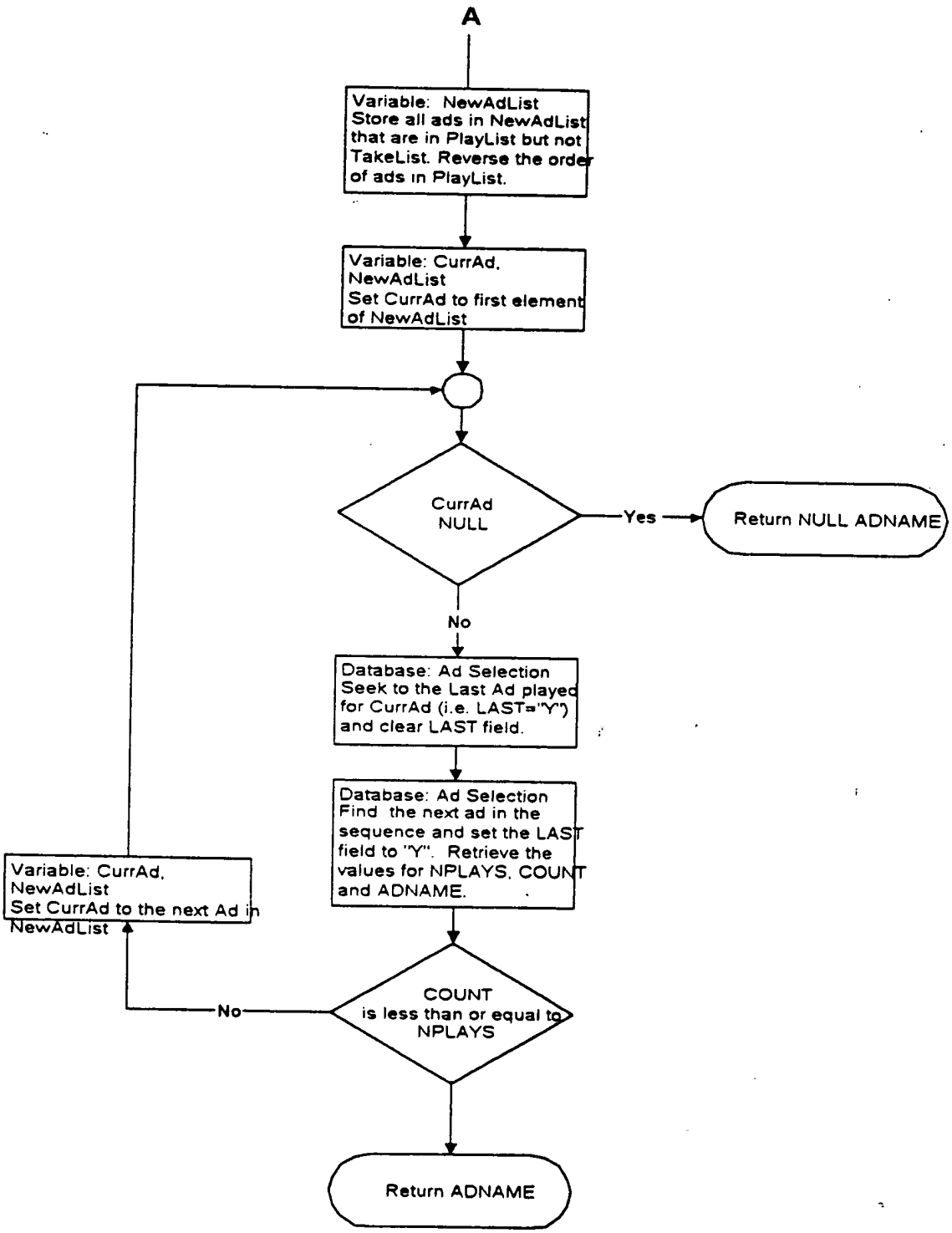
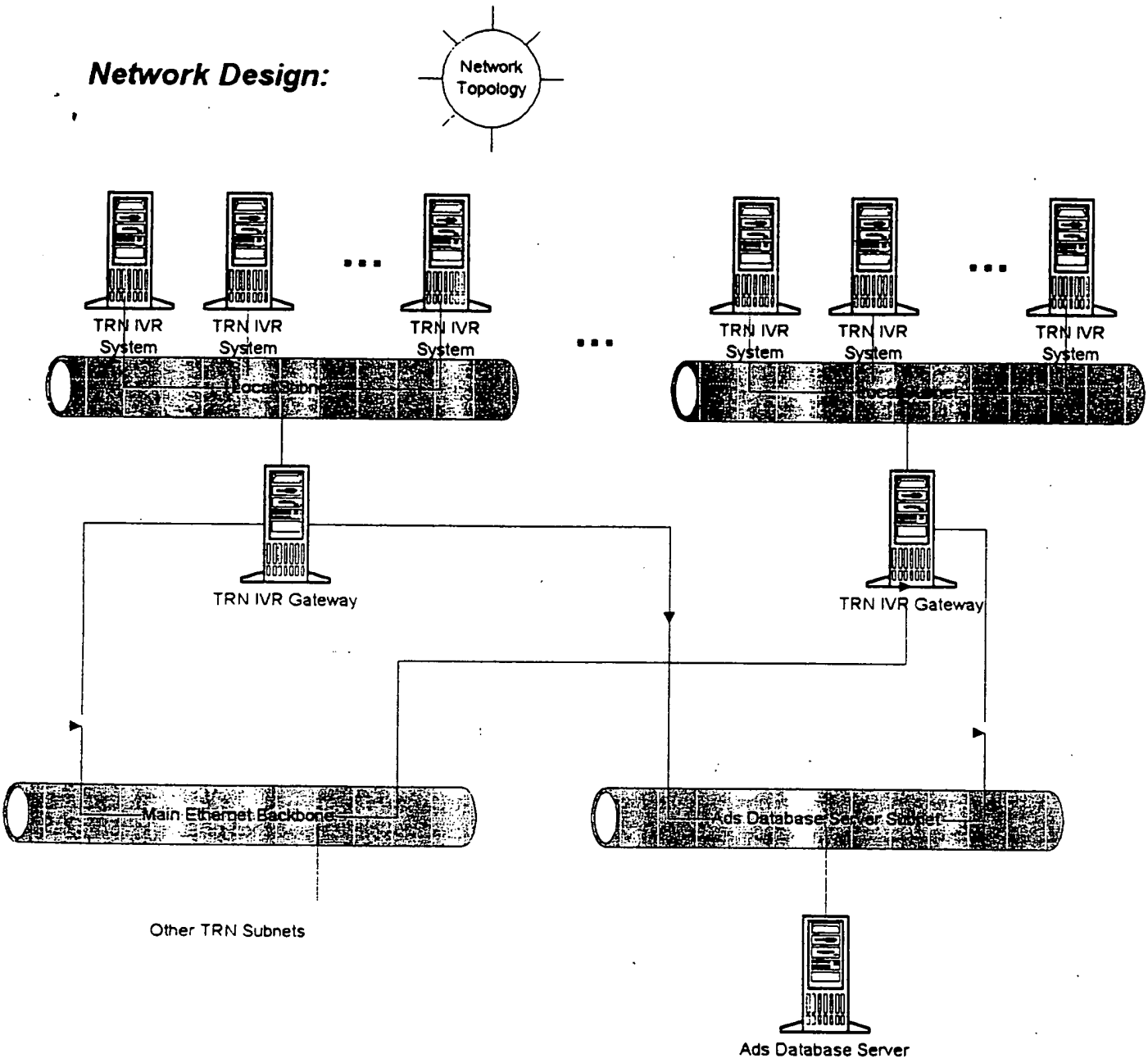


Figure 3 - Ad Selection Algorithm Part 2

Ads Server Database Design

Network Design:



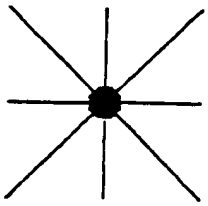
NOTES:

1. The network configuration above is a potential candidate. It is being propsed to eliminate an excessive load on the Ethernet Backbone.

2. This requires the IVR Gateway systems to possess three Network Interface Cards (NICs). This should not be a problem since the Gateway systems do not need to be IVR capable.

3. The Ads Server Database subnet could be run at 100 Mbits/sec as the number of ports increases with new schools being brought on-line.

Distributed Processing Architecture:



IVR Application

REQUEST MESSAGE
Get the next ad for student X at school Y

SendUDP Command

RESPONSE MESSAGE
A list of ads to play to student X from school Y

ReadUDP Command

Database Client Software

REQUEST QUEUE PROCESSING

1. Read UDP Socket
2. Place Request on the Request Queue

RESPONSE QUEUE PROCESSING

1. Read processing response queue
2. Format UDP response message
3. Send UDP response

DATABASE PROCESSING

1. Read input request queue.
2. Perform database queries and associated processing.
3. Format application response.

Database Server Software

Database Query/Command

Database Response

Perform record seek, field get and field put commands.

NOTES:

1. The SendUDP and GetUDP commands are Apex records that executed from within the Grade Reporting or Course Registration application.
2. The Database Client software will run on the IVR Gateway systems.
3. The Database Server software can run on a single IVR Gateway system and be migrated to full client server as the needs of the IVR TRN grow.
4. Each IVR function can make a request from the ADSERVER host. Each IVR system can designate the ADSERVER host name to its designated IVR Gateway system. Hence, network maintenace is removed from the Apex IVR application.

IVR Request & Response Messages

IVR TRN Application | ***Ads Database Client/Server***

NEXTAD, SchoolCode, StudentId, NAds, AdTime

SchoolCode	-	4 digit School Id Code
StudentId	-	9 digit Social Security #
NAds	-	Maximum number of ads to play
AdTime	-	Maximum duration of ads played to the student based on particular school

NEXTAD, SchoolCode, StudentId, A(1), A(2), ... A(NAds)

SchoolCode	-	4 digit School Id Code
StudentId	-	9 digit Social Security #
A(1)	-	First ad to play.
A(2)	-	Second ad to play
...		
A(NAds)	-	Last ad to play

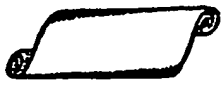
An Ad has the format **SSSPPNNA**. The ad list is is read by the IVR program until the end of line.

The message coming back from the Ads database server has the same preamble as the request message.

PLAYED, SchoolCode, StudentId, Date, Time, AdName, Selected

SchoolCode	-	4 digit School Id Code
StudentId	-	9 digit Social Security #
Date	-	Date ad was played.
Time	-	Time ad was played
AdName	-	SSSPPNNA ad played
Selected	-	Student response to ad

IVR Request & Response Messages



NEXTAD and **PLAYED** are keywords to be decoded by the Ads Database Server.

The NEXTAD message contains the maximum number of ads, NAds, that can be played within the specified ad play interval, AdTime. The AdTime is specified in the contract with the particular university. If NAds is 3, AdTime is 60 and there are 4, 15-second ads that can be played in the 60 second ad slot, only 3 ads will be returned because NAds is the overriding control number.

The ads that are returned from the Ads Database Server have the format SSSPPNNA. Each field is defined below:

SSS	-	Three digit sponsor code. There are 1000 potential sponsors.
PP	-	The sponsor product code. Identifies the particular product(s) being offerred.
NN	-	The particular ad being offered for the particular product.
A	-	The particular ad split number for the ad being offered.

The format above identifies sponsors and products. The ad (i.e. NN) variability allows different ads to be played to different students. The split number (i.e. A) provides the ability to implement A/B split testing and/or hot swapping of ads.

The **PLAYED** message contains the information needed to maintain a single, centralized ad play and take database. There will be 1 PLAYED message for each ad played to a student. One NEXTAD response may generate several PLAYED messages from the IVR application.

Note, both the play and the take information is contained in the **PLAYED** message. The format of this message implies that only initial interest statistics can be gathered from this file. For example, for a Discover Card application, the PLAYED message will contain only that the student either had an interest in obtaining a Discover Card, or that the student successfully filled out the on-line applications. Whether or not, the student application can be successfully transcribed and/or fulfilled is another issue that is separate from this type of record keeping.

Because the ad play and take information is in a single file, the reporting time for statistics will be significantly reduced and the preprocessing simplified.

Sever Database Files:

Student Ads Database:

Field Name	Type	Size	Description
SCHCODE	Character	4	4 digit school code
SOC_SEC	Character	9	9 digit student ID number which is most often a social security number.
ADLIST	Character	120	List of ads that can be played to this student.
PLAYLIST	Character	120	List of ads that have been played to the student.
TAKELIST	Character	120	List of ads that the student has taken during the current period of operation.

NOTE: Records indexed on SCHCODE+SOC_SEC

Ad Selection Database:

Field Name	Type	Size	Description
SPCODE	Character	3	3 character sponsor code.
PRCODE	Character	2	2 character sponsor product code that identifies a particular product or service.
ADCODE	Character	2	2 character ad code that identifies a particular ad for a sponsor product.
SWAPLIST	Character	20	A list of 10, 1 character ad swap numbers to perform split ad testing.
COUNT	Numeric	6.0	The maximum number of times the ad can be played.
NPLAYS	Numeric	6.0	The number of times that this ad has been played.
CATEGORY	Character	40	The ad category used to determine competing ads.
DURATION	Numeric	4.0	The duration of this particular ad.

NOTE: Records indexed on SPCODE+PRCODE+ADCODE

Sever Database Files:

Ad Play Database

Field Name	Type	Size	Description
SPCODE	Character	3	3 character sponsor code.
PRCODE	Character	2	2 character sponsor product code that identifies a particular product or service.
ADCODE	Character	2	2 character ad code that identifies a particular ad for a sponsor product.
ADNUM	Character	1	A list of 10, 1 character ad swap numbers to perform split ad testing.
DATE	Character	8	Date of the ad play.
TIME	Character	8	Time of the ad play.
SCHCODE	Character	4	The student's school code.
SOC_SEC	Character	9	The student's 9-digit id code
SELECTED	Character	1	The student's selection for the ad. A "0" indicates that the ad was not taken by the student.

NOTES:

1. The file is unindexed.

2. The SELECTED field contains gross ad take information. In the case of a credit card ad, the SELECTED field set to "1" may indicate student interest in having the card, or a "1" may indicate a completed application over the phone. The SELECTED field will not indicate that the application has been successfully transcribed.

Sever Database Files:

Student Ads Database Notes:

The Student Ad Database contains a record for every student from every school.

The AdList field contains a comma delimited list of ad names of the form SSSPPAA. The ads are in priority order.

The PlayList field contains a comma delimited list of ad names of the form SSSPPAA. The entries in the list are in the order in which they were played to the student.

The TakeList field contains a comma delimited list of ad names of the form SSSPPAA. The entries in the list are in the order in which they were taken.

Ad Selection Database Notes:

The Ad Selection Database is indexed on SPCODE+PRCODE+ADCODE.

The SWAPLIST field is a comma delimited list of swap numbers. If there is no split testing required, there will only be one item in the list.

To "hot-swap" an ad, a new ad can be created with a new last character. The Ad Selection Database can be changed such that the SWAPLIST field can be changed to the new last character. Ad changes can be made without changing the Student Ads Database.

The CATEGORY field is a list of competitor categories. Most of the ads will not require a category list. BEWARE: Using category codes for every sponsor and product and ad may yield unanticipated results. For example, two USS ads will have the same category and will not be able to reside in the same ad play window of opportunity. While it is true that the sponsor codes can be compared, this is one more level of comparisons that may render this algorithm useless.

Sever Database Files:

Ad Play Database Notes:

The Ad Play database is unindexed. Records are appended as the IVR application PLAYED messages are received and processed.

There are separate fields for SPCODE, PRCODE, ADCODE and ADNUM. This will allow ad response statistics to be computed based on Sponsor, Sponsor and Product, a particular ad(s) for a particular sponsor's product, etc.

The SELECTED field indicates the student's response to the ad. If the student negatively responds to an ad, a field value of "0" will be recorded.

NEXTAD Algorithm

Inputs:

SchoolCode	-	4 digit code identifying student's school.
StudentId	-	9 digit code identifying student
NAds	-	Maximum number of ads to play.
AdTime	-	Maximum ad play time for this phone call.

Local Variables:

AdList	-	Contains the contents from the ADLIST field in the Students Ad Database
PlayList	-	Contains the contents from the PLAYLIST field in the Students Ad Database
TakeList	-	Contains the contents from the TAKELIST field in the Students Ad Database
ToPlayList	-	List of ads that can be played to the student.
UnPlayedList	-	List of ads from AdList that have not already been played to the student.
PlayedList	-	List of ads from AdList that have already been played but not taken by the student.
CurrAd	-	Current ad under consideration.
ReturnAdList	-	List of ads to be played to the student.
CategoryList	-	List of ad categories that are already in the ReturnAdList. Use of categories will prevent competing products to be played within the same student call.
TotalAds	-	The total number of ads that are currently contained in ReturnAdList
PlayLength	-	The total amount of ad play time for ads currently contained in ReturnAdList

Functions:

PushTail(List, Item)

Adds an "Item" to the end of a comma delimited "List". For example, PushQueue("1,2,3", "4") will result in the list "1,2,3,4".

PopTail(List)

Returns the last item from the end of a comma delimited "List" and removes the item from the end of the "List".

PushHead(List, Item)

Adds an "Item" to the head of a comma delimited "List". For example, PushHead("1,2,3", "4") will result in the list "4,1,2,3".

PopHead(List)

Returns the first item from the top of a comma delimited "List" and removes the item from the top of the list.

NEXTAD Algorithm

Functions (Cont'd)

ContainedIn(ItemList, List)

Returns TRUE if any item in "ItemList" is contained in "List". "ItemList" is a comma delimited list as is "List". If either "ItemList" or "List" are NULL, FALSE is returned. If no elements of "ItemList" are contained in "List" FALSE is returned.

Psuedo-Code:

Student Ads Database: seek for **SchoolCode+StudentId**
if not found
    return **NULL** ad string.
endif

Put field **ADLIST** into **AdList**.
Put field **PLAYLIST** into **PlayList**
Put field **TAKELIST** into **TakeList**

Set **UnPlayedList** to **NULL**
Set **PlayedList** to **NULL**
Set **CurrAd** to *PopHead*(AdList)

while **CurrAd** is not **NULL**
    if *ContainedIn*(**CurrAd, PlayList**)
        if NOT ContainedIn(**CurrAd, TakeList**)
            PushTail(**PlayedList, CurrAd**)
        endif
    else
        PushTail (**UnPlayedList, CurrAd**)
    endif
    Set CurrAd to *PopHead*(**AdList**)
endwhile

Set **ToPlayList** to **UnPlayedList + PlayedList**

NEXTAD Algorithm:

```
Set ReturnAdList to NULL
Set CategoryList to NULL
Set CurrAd to PopHead( ToPlayList )
Set TotalAds to 0
Set PlayLength to 0

while CurrAd is not NULL and TotalAds < NAds

        Ad Selection Database: seek for CurrAd
        if record found
                Set SwapList to SWAPLIST field
                Set PlayLimit to COUNT field
                Set NumPlays to NPLAYS field
                Set CatCodes to CATEGORY field
                Set AdLength to DURATION field

                if NumPlays < PlayLimit and
                  NOT ContainedIn( CatCodes, CategoryList ) and
                  PlayLength+AdLength < AdTime
                        Set SwapNum to PopHead( SwapList )
                        PushTail( SwapList, SwapNum )
                        Ad Selection Database: put SwapList into SWAPLIST field
                        Set AdToPlay to CurrAd + SwapNum
                        Append CatCodes to CategoryList
                        Increment TotalAds by 1
                        Increment PlayLength by AdLength
                        PushTail ( ReturnAdList, AdToPlay )
                endif
        endif

        Set CurrAd to PopHead( ToPlayList )

endwhile

return ReturnAdList
```